Lloyd's Register

Rules and Regulations for the Classification of Naval Ships, January 2011

Notice No. 1

Effective Date of Latest Amendments:

See page 1

Issue date: February 2011

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RULES AND REGULATIONS FOR THE CLASSIFICATION OF NAVAL SHIPS, *January 2011*

Notice No. 1

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Naval Ships, January 2011.* The amendments are effective on the dates shown:

Volume	***Part***	***Chapter***	***Section***	***Effective date***
1	1	2	Introduction, 3, 4, 7	1 January 2011
1	4	3	2	Corrigendum
1	6	4	2	Corrigendum

It will be noted that the amendments also include corrigenda, which are effective from the date of this Notice.

The *Rules and Regulations for the Classification of Naval Ships, January 2011* are to be read in conjunction with this Notice No. 1. The status of the Rules is now:

Rules for Naval Ships	Effective date:	January 2011
Notice No. 1	Effective date:	1 January 2011 & Corrigenda

Volume 1, Part 1, Chapter 2

Classification Regulations

Effective date 1 January 2011

■ *Introduction*

Definition of Hull Naval Class

Naval Ship Classification may be regarded as the development and worldwide implementation of published Rules and Regulations, which, in conjunction with proper care and conduct on the part of the Owner, will provide for:

1. the structural strength and the watertight integrity of all essential parts of the hull and its appendages; this includes compliance with a suitable damage stability standard accepted by LR;
2. the safety and reliability of propulsion, steering and other essential auxiliary engineering systems;

~~2.~~ 3. the operation and functioning of associated systems installed for operational requirements relating to the ship type; and

~~3.~~ 4. the effectiveness of other defined features and systems which have been built into the ship in order to establish and maintain basic conditions on board whereby appropriate stores, fuels, equipment and personnel can be safely carried whilst the ship is at sea, at anchor, or moored in harbour.

A naval ship is said to be in Class when the Rules and Regulations which pertain to it have been complied with, or compliance, equivalent to the Rules, has been ascertained.

LR maintains these provisions by way of periodical visits by its Surveyors to the ship as defined in the Regulations in order to ascertain that the vessel currently complies with those Rules and Regulations. Records of any defects found, or modifications carried out, between visits by LR surveyors, which may affect Classification, are to be maintained. Any defects found are to be reported to LR with the minimum of delay. The records will form the basis of remedial action, where necessary, for maintenance of Class.

Options

The handling of safety matters such as ship's stability, life saving appliances, pollution prevention arrangements and structural fire protection, fire detection and extinction arrangements is the prerogative of the Owner and his delegated Naval Authority. However, where these matters are delegated to LR they will be undertaken in accordance with agreed procedures and appropriate class notations will be assigned and entered into the ~~*Register Book*~~ vessel's Classification record.

~~Machinery Naval Class~~

~~Where agreed Naval Ship Classification will provide for the safety and reliability of propulsion, steering and other essential auxiliary engineering systems, including the arrangements for lifting appliances. When Machinery Naval Class is adopted, the aspects included in the definition of Hull Naval Class also apply.~~

■ *Section 3*
Character of Classification and Class notations

3.1 General

3.1.5 The following are examples of character symbols, and Class notations as they would appear in the ~~*Register Book*~~ vessel's Classification record:

✠ 100A1 NS2 Frigate, SA1, AIR
✠ LMC, SCM, SDA, ESA1, RSA2, Ice Class 1C
✠ MD, SEA, EER.

3.2 Character symbols

3.2.2 A full list of character symbols for which a ship may be eligible is as follows:

✠	This distinguishing mark will be assigned, at the time of Classing, to new ships constructed under Special Survey, in compliance with the Rules, and to the satisfaction of LR.
100	This character figure will be assigned to all ships considered suitable for sea-going service~~ for Hull Naval Class~~.
A	This character letter will be assigned to all ships which have been built or accepted into Class in accordance with the Rules and Regulations, and which are maintained in good and efficient condition.
1	This character figure will be assigned to: (a) Ships having on board, in good and efficient condition, anchoring and/or mooring equipment in accordance with the Rules. (b) Ships Classed for a specific service, having on board, in good and efficient condition, anchoring and/or mooring equipment approved by the Classification Committee as suitable and sufficient for the particular service.
E	This character letter will be assigned to ships on which LR has agreed that anchoring and mooring equipment need not be fitted in view of their particular service.

(*Part only shown*)

3.2.5 The Navy or Naval Authority may specify alternative or additional standards/requirements relating to the application of a character symbol or Class notation. Where these alternative or additional standards/requirements have been agreed by LR and a formal process for approval, construction, testing and verification throughout life has been established, this feature will be recognised by the addition of **(NS)** to a character symbol or Class notation. The alternative or additional requirements of the Navy or Naval Authority are to be clearly defined and referenced in the Classification Certificates and any required registers such as the register of lifting appliances. The following are examples of character symbols and Class notations that may recognise Navy or Naval Authority requirements as they may appear in the ~~*Register Book*~~ vessel's Classification record:

3.4 Ship type notations

3.4.1 The ship type notation will be recorded in the appropriate ~~Register Book~~ Classification record indicating the primary purpose for which the ship has been designed and constructed.

3.8 Machinery and Engineering Systems notations

(*Part only shown*)

3.8.1 The following class notations are associated with the machinery construction and arrangement, and may be assigned:

[✠]LMC This notation will be assigned when the propelling arrangements, steering systems, pressure vessels and the electrical equipment for essential systems have been constructed, installed and tested under LR's Special Survey and are in accordance with LR's Rules for Naval Ships. Other items of machinery for propulsion and electrical power generation including propulsion gearing arrangements and other auxiliary machinery for essential services that are in compliance with LR's Rules and supplied with the manufacturer's certificate will be acceptable under this notation. The system arrangements of propelling and essential auxiliary machinery are required to be appraised by LR, and found to be acceptable to LR. *See* Section 3.10.2 below.

LMC This notation (without ✠) will be assigned when the propelling and essential auxiliary machinery has neither been constructed nor installed under Special Survey, but the existing machinery, its installation and arrangement has been tested and found acceptable. This notation is assigned to existing ships in service which are accepted or ~~transferring~~ transferred into LR class.

MCH This notation will be assigned when the propelling and essential auxiliary machinery has been installed and tested under LR's survey requirements and found to be acceptable to LR. Items of machinery and equipment for propelling and auxiliary machinery for essential services supplied with the manufacturer's certificate will be acceptable under this class notation. The system arrangements of propelling and essential auxiliary machinery are required to be appraised by LR, and found to be acceptable to LR. *See* Section 3.10.3 below.

3.9 Other notations

(*Part only shown*)

3.9.3 **LAP**. This optional special feature Class notation will be assigned to the ship in respect of the lifting appliances fitted which are designed and built in accordance with LR's *Code for Lifting Appliances in a Marine Environment* (LAME) or equivalent standard, but where it is not mandated by the LA notation, *see* Section 3.9.2 below. This notation will be assigned in association with a register of lifting appliances listing the appliances covered. The register, which is to be attached to the Classification Certificate, is the responsibility of the designer/Owner and should include the following lifting appliances, where fitted as appropriate:

3.9.21 **SD Special Duties Notation**. A special duties notation will be recorded in the ~~Register Book~~ vessel's Classification record indicating that the ship has been designed, modified or arranged for special duties other than those implied by the type notation. Ships with special duties notations are not thereby prevented from performing any other duties for which they may be suitable.

3.10 Application notes

3.10.2 **Manufacturer's certificate** for assignment of the **[✠]LMC** notation. Acceptance of the manufacturer's certificate for items of machinery for propulsion (including propulsion gearing with single input/output arrangements) and for electrical power generation and for other auxiliary machinery for essential services is subject to the following:

(a) The vessel is an NS3 ship or an NSA ship of less than 500 gross tonnage or is a ship of 500 gross tonnage or greater and is not required to comply with international conventions applicable to a ship with unrestricted service.
(b) Propulsion power is provided by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR's requirements for marine application.
(c) Electrical power is provided by generators driven by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR's requirements for marine application.
(d) The design and manufacture standards for all machinery and associated systems are the applicable LR's Rules.
(e) The machinery and equipment is manufactured under a recognised quality control system.
(f) Propellers, propulsion shafting and multiple input/output gearboxes are not included within the scope of propulsion arrangements for acceptance of a manufacturer's certificate.

See Section 6.

3.10.3 **Manufacturer's certificate** for assignment of the **MCH** notation. Acceptance of the manufacturer's certificate for propelling and essential auxiliary machinery is subject to the following:

(a) The ship is an NS3 ship or an NSA ship of less than 500 gross tonnage or is a ship of 500 gross tonnage or greater and is not required to comply with international conventions applicable to a ship with unrestricted service.
(b) Propulsion power is provided by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR's requirements for marine application.
(c) Electrical power is provided by generators driven by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR's requirements for marine application.
(d) The power of any engine or gas turbine is less than 2,250 kW and the cylinder bore of any diesel engine is not greater than 300 mm.
(e) The design standards for machinery and associated systems are the applicable LR's Rules or other marine standards acceptable to LR.
(f) The machinery and equipment is manufactured under a recognised quality control system.

See Section 6.

■ *Section 4*
Surveys – General

4.1 New construction

~~Plan Appraisal~~

4.1.2 Where the proposed construction of any part of the hull or machinery is of novel design, or involves the use of unusual material, or where experience has not sufficiently justified the principle or mode of application involved, special tests or examinations before and during service may be required. In such cases a suitable notation may be entered in the ~~*Register Book*~~ vessel's Classification record.

4.1.3 The materials used in the construction of hulls and machinery intended for Classification are to be of good quality and free from defects and are to comply with the requirements of the Rules. Material is to be manufactured ~~by~~ at a works approved by LR. Alternatively, tests to the satisfaction of LR will be required to demonstrate the suitability of the material.

4.1.4 Copies of the latest approved plans, essential certificates and records, required loading and other instruction manuals are to be readily available for use when required by ~~LR's~~ the attending Surveyors and are thereafter required to be kept on board.

4.2 Survey

4.2.7 When a ship, upon completion, is not immediately commissioned but is laid-up for a period, LR, upon application by the Owner, prior to the ship proceeding to sea, will direct an examination to be made by ~~LR's~~ the Surveyors which may include a survey in dry dock. If, as the result of such survey, the hull and machinery is reported in all respects ~~free from deterioration~~ in accordance with applicable Rule requirements, ~~in compliance with the Rules,~~ the subsequent Special Survey will date from the time of such examination.

4.3 Existing ships

4.3.3 **Reclassification.** When reclassification or Class reinstatement is ~~desired~~ requested for a ship for which the Class previously assigned by LR has been withdrawn or suspended, LR will direct that a survey, appropriate to the age of the ship and the circumstances of the case, be carried out by ~~LR's~~ Surveyors. If, at such survey, the ship ~~be~~ is found or placed in a good and efficient condition in accordance with the Rules and Regulations, LR will be prepared to consider reinstatement of the original Class or the assignment of such other Class as may be deemed ~~necessary~~ appropriate. The date of any reclassification will be recorded in the ~~Supplement to the *Register Book*~~ vessel's Classification record. When the original classification was not to the Rules for Naval Ships, then it will be necessary to demonstrate compliance with the additional requirements of these Rules.

4.4 Damages, repairs and alterations

4.4.1 All repairs to hull, equipment and machinery which may be required in order that a ship may retain Class, *see* Section 1.1.7 above, are to be carried out to the satisfaction of ~~LR's~~ the Surveyors. When repairs are ~~effected~~ affected at a port, terminal or location where the services of a Surveyor to LR are not available, the repairs are to be surveyed by ~~LR~~ one of the Surveyors at the earliest opportunity thereafter.

4.4.3 Where repairs are to be carried out by a riding crew during a voyage then these must be planned in advance. A complete repair procedure, including the extent of proposed repair and the need for Surveyor's attendance during the voyage, is to be submitted reasonably in advance to the Surveyor for agreement. Failure to notify LR in advance of the repairs may result in the class of the ship being specially considered by the Classification Committee. Where emergency repairs are effected immediately due to an extreme emergency circumstance, the repairs should be documented in the ship's log and submitted thereafter to LR for use in determining further survey requirements.

~~*4.4.3*~~ *4.4.4* When at any survey the Surveyor considers repairs to be immediately necessary, either as a result of damage, or wear and tear, they are to communicate their recommendations at once to the Owner, or his representative. When such recommendations are not complied with, immediate notification is to be given to ~~LR's London~~ the vessel's Naval Classification Liaison Office by the Surveyor.

~~*4.4.4*~~ *4.4.5* When at any survey it is found that any damage, defect, or breakdown (*see* Section 1.1.7 above) is of such a nature that it does not require immediate permanent repair, but is sufficiently serious to require rectification by a prescribed date in order to maintain Class, a suitable Condition of Class is to be imposed by the Surveyors and recommended for consideration. This condition may be designated as an operational defect, under the Owner's control, but LR needs to be kept advised as to proposed actions. The technical impact of any deficiency on the operational needs of the ship must be considered by the surveyor in liaison with the Owner/Naval Authority before a decision is made with regard to corrective action.

Existing paragraphs 4.4.5 *to* 4.4.7 *have been renumbered* 4.4.6 *to* 4.4.8.

4.5 Existing ships – Periodical Surveys

4.5.1 **Annual Surveys** are to be held on all ships within three months, before or after each anniversary of the completion, commissioning or Special Survey. The date of the last Annual Survey will be recorded in the ~~Supplement to the *Register Book*~~ vessel's Classification record. This survey may include optional requirements.

4.5.2 **Intermediate Surveys** are to be held on all ships instead of the third or fourth Annual Survey after completion, commissioning or Special Survey. The date of the last Intermediate Survey will be recorded in the ~~Supplement to the *Register Book*~~ vessel's Classification record.

4.5.4 The date of the last Docking Survey will be recorded in the ~~Supplement to the *Register Book*~~ vessel’s Classification record.

4.5.5 Classification details and Survey requirements for **In-water Surveys** are given in Section 7 and Ch 3,4.3 respectively. An In-water Survey can be carried out in lieu of a Docking Survey for inspection of the underwater hull and appendages between the Docking Surveys that are to be carried out concurrently with the Special Survey. The date of the last In-water Survey will be recorded in the ~~Supplement to the *Register Book*~~ vessel’s Classification record, preceded with the notation ***IWS**.

4.5.6 All ships classed with LR are also to be subjected to **Special Surveys**. These Surveys become due at six-yearly intervals, the first one six years from the date of build or date of Special Survey for Classification as recorded in the ~~*Register Book*~~ vessel’s Classification record, and thereafter six years from the date recorded in the ~~Supplement to the *Register Book*~~ vessel’s Classification record for the previous Special Survey. Consideration can be given, at the discretion of LR, to any exceptional circumstances justifying an extension of hull Classification beyond the sixth year. If an extension is agreed the next period of hull Classification will start from the due date of the Special Survey before the extension was granted. In this context ‘exceptional circumstances’ means unavailability of dry-docking facilities; repair facilities; essential materials; equipment or spare parts; delays incurred by action taken to avoid severe weather conditions; or urgent operational requirements.

4.5.9 Ships which have satisfactorily passed a Special Survey will have a record entered in the ~~Supplement to the *Register Book*~~ vessel’s Classification record indicating the date. Where the Special Survey is completed more than three months before the due date, the new record of Special Survey will be the final date of survey. In all other cases the date recorded will be the sixth anniversary.

4.5.10 At the request of an Owner, ~~LR~~ it may ~~agree~~ be agreed that the Special Survey of the hull can be carried out on ~~the~~ a Continuous Survey basis, all compartments of the hull being opened for survey and testing, in rotation, with an interval of six years between consecutive examinations of each part. In general, approximately one sixth of the Special Survey is to be completed each year and all the requirements of the particular hull Special Survey must be completed at the end of the six-year cycle. Ships which have satisfactorily completed the cycle will have a record entered in the ~~Supplement to the *Register Book*~~ vessel’s Classification record indicating the date of completion which will not be later than six years from the last assigned date of Complete Survey of the hull.

4.5.14 Complete Surveys of machinery become due at six-yearly intervals, the first one six years from the date of build or date of first classification as recorded in the ~~*Register Book*~~ vessel’s Classification record, and thereafter six years from the date recorded in the ~~Supplement to the *Register Book*~~ vessel’s Classification record for the previous Complete Survey. Consideration can be given at the discretion of LR to any exceptional circumstances justifying an extension of machinery class to a maximum of three months beyond the sixth year. If an extension is agreed to, the next period of machinery class will start from the due date of Complete Survey of machinery before extension was granted. Surveys which are commenced prior to their due date are not to extend over a period greater than 12 months, except with the prior approval of LR. On satisfactory completion of a survey, an appropriate record will be made in the ~~Supplement to the *Register Book*~~ vessel’s Classification record. Where the complete survey is completed more than three months before the due date, the new date recorded will be the final date of survey. In all other cases the date recorded will be the sixth anniversary. *See also* Section 4.5.20 below.

4.5.15 Upon application by an Owner, LR may agree to the extension of the survey requirements for main propulsion machinery, which, by the nature of the ship’s normal service, do not attain the number of running hours recommended by the machinery manufacturer for major overhauls within the survey periods given in Section 4.5.14 above.

4.5.16 When, at the request of an Owner, it has been agreed by LR that the Complete Survey of the machinery may be carried out on ~~the~~ a Continuous Survey basis, the various items of machinery are to be opened for survey in rotation, so far as is practicable, to ensure that the interval between consecutive examinations of each item will not exceed six years. In general, approximately one-sixth of the machinery is to be examined each year. A record indicating the date of satisfactory completion of the Continuous Survey cycle will be made in the ~~Supplement to the *Register Book*~~ vessel’s Classification record. *See also* Section 4.5.20 below.

4.5.17 Upon application by an Owner, LR may agree to an arrangement whereby, subject to certain conditions, some items of machinery may be examined by the qualified naval engineering personnel responsible to the Marine Engineer Officer of the ship, followed by a limited confirmatory survey and annual audit of maintenance and repairs records. Particulars of this arrangement may be obtained from ~~LR’s London~~ the vessel’s Naval Classification Liaison Office. Where an approved planned maintenance scheme is in operation the confirmatory surveys of machinery may be held at annual intervals, at which time the records will be checked and the operation of the scheme verified. Particulars of this arrangement may also be obtained from ~~LR’s London~~ the vessel’s Naval Classification Liaison Office.

4.5.21 Boiler surveys, examination of steam pipes and Screwshaft Surveys are to be carried out as stated in Pt 1, Ch 3,11 and 12 of these Regulations. On satisfactory completion, appropriate records will be made in the ~~Supplement to the *Register Book*~~ vessel’s Classification record.

4.6 Certificates

4.6.1 When survey reports have been received from the Surveyors and ~~approved by LR~~ classification has been agreed by the Classification Executive, a Certificate of Classification may be issued by an authorised Surveyor. After approval by the Classification Committee, a Certificate of First Entry of Classification, signed by ~~the~~ LR's Chairman, or the ~~Deputy Chairman and~~ Chairman of the Sub-Committee of Naval Classification Committee, ~~will~~ may be issued to the Builders or Owners.

4.8 Withdrawal/Suspension of Class

4.8.7 In all instances of Class withdrawal or suspension, the assigned notation, with date of application, will ~~initially~~ appear in the ~~Supplement to the *Register Book*~~ vessel's Classification record ~~and subsequently in the *Register Book*~~. In cases where Class has been suspended by LR and it becomes apparent that the Owners are no longer interested in retaining LR's Class, the notation will be amended to withdrawn status. After Class withdrawn status has been established in the ~~*Register Book*~~ vessel's Classification record for one year, it will be automatically amended to 'Classed LR until' (with date).

4.10 Appeal from Surveyor's recommendation

4.10.1 If the recommendations of ~~LR's~~ the Surveyors are considered in any case to be unnecessary or unreasonable, appeal may be made to LR, who may direct a Special Examination to be held.

■ *Section 7*
Classification of ship with *IWS notation

7.1 General

7.1.1 Where the ***IWS** class notation for In-water Survey is requested, application should be made to the ~~Committee~~ vessel's Naval Classification Liaison in writing with evidence of the Owner's agreement.

Volume 1, Part 4, Chapter 3
Classification Regulations

CORRIGENDUM

■ *Section 2*
Vehicle decks and fixed ramps

2.3 Deck plating

(*Part only shown*)

Table 3.2.1 Deck plate thickness calculation

Symbols	Expression
a, s, u, and v as defined in Fig. 3.2.1 n = tyre correction factor as detailed in Table 3.2.2 F_{typ} = corrected patch load for plating, in kN λ = dynamic magnification factor W_{ty} = load, in kN, on the tyre print. For closely spaced wheels the area shown in Fig. 2.10.2 may be taken as the combined print ϕ_1 = patch aspect ratio correction factor ϕ_2 = panel aspect ratio correction factor ϕ_3 = wide patch load factor	$F_{typ} = \phi_1 \phi_2 \phi_3 \lambda W_{ty}$
	$\phi_1 = \dfrac{2v_1 + 1{,}1s}{u_1 + 1{,}1s}$ $v_1 = v$, but $\leq s$ ~~$u_1 = v$, but $\leq a$~~ $u_1 = u$, but $\leq a$

Volume 1, Part 6, Chapter 4

Hull Girder Strength

CORRIGENDUM

■ *Section 2*

Hull girder strength

2.5 Superstructures global strength

(*Part only shown*)

2.5.2 For superstructures with one or two tiers extending outboard to the ship's side shell, the effectiveness in absorbing hull girder bending loads in the uppermost effective tier may be assessed by the following factor:

$$\eta_S = 7\,(\,(\varepsilon - 5)\,\gamma^4 + 94\,(5 - \varepsilon)\,\gamma^3 + 2800\,(\varepsilon - 5{,}8)\,\gamma^2 + 27660\,(9 - \varepsilon)\,\gamma)\,f(\lambda, N) \times 10^{-7}$$

Cross-references

Section numbering in brackets reflects any Section renumbering necessitated by any of the Notices that update the current version of the Rules for Naval Ships.

Volume 1, Part 1, Chapter 2

4.8.4	*Reference* 4.4.3 *now reads* 4.4.4 *Reference* 4.4.4 *now reads* 4.4.5
4.8.5	*Reference* 4.4.6 *now reads* 4.4.7

Volume 1, Part 1, Chapter 3

2.2.7	*Reference* Ch 2,4.4.7 *now reads* Ch 2,4.4.8
2.3.17	*Reference* Ch 2,4.4.7 *now reads* Ch 2,4.4.8

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